

Claims

1. A method of producing a polymer composite comprising a polymer matrix having metal nanoparticles incorporated therein, said method comprising the steps of:
- 5 (i) mixing metal nanoparticles with a polymer dope; and
(ii) solidifying the polymer composite from the dope.
- 10 2. A method according to claim 1, wherein the dope is stirred vigorously so as to produce a homogeneous mixture.
3. A method according to claim 2, wherein a high shear mixer is used to stir the dope.
- 15 4. A method according to any preceding claim, wherein the metal nanoparticles are added directly to the polymer dope as a powder.
5. A method according to any preceding claim, wherein the metal nanoparticles comprise one or more transition metals.
- 20 6. A method according to any preceding claim, wherein the polymer composite is solidified by an extrusion process.
7. A method according to claim 6, wherein the polymer composite is extruded to form fibres.
8. A method according to claim 7, wherein the fibres are extruded by a spinning technique.
- 25 9. A method according to claim 8, wherein the fibres are extruded by a wet spinning technique.
10. A method according to any one of claims 6 to 9, wherein the polymer dope comprises a linear polymeric material having fibre forming characteristics.
- 30 11. A method according to any preceding claim, wherein the metal nanoparticles have antimicrobial properties.
12. A method according to claim 11, wherein the nanoparticles comprise silver.
- 35 13. A method according to any one of claims 6 to 12, wherein the polymer matrix comprises alginate.

14. A method according to any one of claims 6 to 12, wherein the polymer matrix comprises polyacrylonitrile.
15. A method according to any preceding claim, wherein the metal nanoparticles have a size less than 500 nm.
- 5 16. A method according to claim 15, wherein the metal nanoparticles have a size less than 100 nm.
17. A method according to claim 16, wherein the metal nanoparticles have a size in the range 20 to 100 nm.
18. Fibres produced by a method according to any one of claims 7 to 17.
- 10 19. A wound dressing comprising fibres according to claim 18.
20. A woven or non-woven fibrous article containing fibres according to claim 18, particularly a fabric comprising said fibres.
- 15 21. Fibres comprising a polymer matrix having at least one metal incorporated therein, wherein the at least one metal is in the form of nanoparticles.
22. Fibres according to claim 21, wherein the nanoparticles are distributed in a substantially uniform manner across the fibre cross section.
- 20 23. Fibres according to claim 21 or claim 22, wherein the metal nanoparticles have a size less than 500 nm.
24. Fibres according to claim 23, wherein the metal nanoparticles have a size less than 100 nm.
- 25 25. Fibres according to claim 24, wherein the metal nanoparticles have a size in the range 20 to 100 nm.
26. Fibres according to any one of claims 21 to 25, wherein the metal nanoparticles have antimicrobial properties.
27. Fibres according to claim 26, wherein the metal nanoparticles comprise Ag, Au, Pt, Pd, Ir, Sn, Cu, Sb, Bi, or Zn, or any combination thereof.
- 30 28. Fibres according claim 27, wherein the metal nanoparticles comprise Ag.
29. Fibres according to any one of claims 21 to 28 having a diameter of less than 500 microns.
- 35

30. Fibres according to claim 29 having a diameter of less than 100 microns.
31. Fibres according to claim 30 having a diameter of 10 to 50 microns.
- 5 32. Fibres according to any one of claims 21 to 31, wherein the polymer matrix comprises a synthetic polymer, a natural polymer or any combination thereof.
33. Fibres according to claim 32, wherein said natural polymer comprises alginate.
- 10 34. Fibres according claim 33, wherein the polymer matrix comprises alginate and Ag is present in the polymer matrix in an amount between 0.1 and 15 % w/w, and preferably in an amount between 0.1 and 2 % w/w.
35. Fibres according to claim 32, wherein said synthetic polymer
15 comprises polyacrylonitrile.
36. Fibres according claim 35, wherein the polymer matrix comprises polyacrylonitrile and Ag is present in the polymer matrix in an amount between 0.05 and 2 % w/w.
37. A wound dressing comprising fibres according to claim 33 or
20 claim 34.
38. A fabric comprising fibres according to any one of claims 21 to 37.
39. A polymer composite comprising a polymer matrix having metal nanoparticles incorporated therein.
- 25 40. The use of a polymer composite or fibres or fabrics according to any preceding claim to produce an article having antimicrobial properties.
41. Any novel feature or combination of novel features hereinbefore described.
- 30 42. A process, product or apparatus substantially as hereinbefore described with reference to the accompanying Figures.